CLAIMS

1. A method for generating an enhanced image, the method comprising the steps of:

(a) receiving a matrix of pixels representative of an image;

(b) generating a gradient image, the gradient image comprises a matrix of values, representative of a difference between values of adjacent pixels;

(c) calculating a center of mass for each pixel of the gradient image in response to gradient intensity values and location values of neighboring pixels; and

(d) generating an enhanced image by modifying intensity values of pixels of the matrix of pixels that are located in a vicinity of local centers of mass in response to intensity values of pixels that are further displaced from the local centers of mass.

2. The method of claim 1 wherein the step of generating a gradient image is preceded by a step of smoothing the image.

3. The method of claim 2 wherein the image is smoothed to decrease noise magnification resulting from the step of generating the gradient image.

4. The method of claim 2 wherein the step of smoothing and the step of generating a gradient image comprising applying a Canny filter on the pixels of the image.

5. The method of claim 2 wherein the step of smoothing comprising applying a kernel operation on the pixels of the image.

6. The method of claim 1 wherein neighboring pixels of each pixel of the gradient image comprise pixels within a neighborhood pattern.

7. The method of claim 6 wherein the neighborhood pattern is symmetric around the pixel.

8. The method of claim 6 wherein the neighborhood pattern is asymmetric around the pixel.

9. The method of claim 6 wherein the neighborhood pattern is selected from a list consisting of a cross, a diamond, a rectangle and an octagonal region.

10. The method of claim 6 wherein a pixel is located in a vicinity of local center of mass if a distance between the pixel and at least a portion of the local center of mass does not exceed a length of the neighborhood pattern.

11. The method of claim 6 wherein a pixel is located in a vicinity of local center of mass if a distance between the pixel and at least a portion of the local center of mass does not exceed half a length of the neighborhood pattern.

12. The method of claim 6 wherein a pixel is located in a vicinity of local center of mass if the pixel and at least a portion of the local center of mass are located within at least one single neighborhood pattern.

13. The method of claim 6 wherein step (d) is followed by a step (f) of changing the neighborhood pattern and wherein step (f) is followed by step (c).

14. The method of claim 13 wherein the changing comprising changing the size of the neighborhood pattern.

15. The method of claim 1 wherein the step of calculating a center of mass of a pixel of the gradient image comprising the steps of: generating a sum result by summing results of a multiplication between a intensity value of a neighbor pixel

and a location value of the neighbor pixel, for each neighbor pixel; and dividing the sum result by a sum of gradient intensity values of all neighbor pixels.

16. The method of claim 14 wherein a location value reflects a displacement from a pixel selected from a group consisting of a local center of mass and the gradient image origin.

17. The method of claim 1 wherein the center of mass reflects a size of an object within the matrix of pixels.

18. The method of claim 16 wherein limiting a modification of pixel values that are located in a vicinity of small objects.

19. The method of claim 16 wherein preventing a modification of pixel values that are located in a vicinity of small objects.

20. The method of claim 1 wherein the step of generating an enhanced image comprising replacing pixel values of pixels that are located in a vicinity of local centers of mass with pixel values of pixels that are further displaced from the local centers of mass.

21. The method of claim 1 wherein the step of generating an enhanced image comprising a step of selecting a pixel further displaced from a local center of mass for each pixel located in the vicinity of the local center of mass.

22. The method of claim 21 wherein the selection is responsive to a displacement of a center of mass and the pixel located in the vicinity of the center of mass.

23. The method of claim 22 wherein the selection is further responsive to a weight factor.

24. The method of claim 23 wherein the weight factor is responsive to size of an object delimited by local centers of mass.

25. The method of claim 1 wherein the image is generated by a scanning electron microscope.

26. A method for generating an enhanced image, the method comprising the steps of:

(a) receiving a matrix of pixels representative of an image;

(b) estimating at least one edge of the image; and

(c) generating an enhanced image by modifying intensity values of pixels of the matrix of pixels that are located in a vicinity of the at least one estimated edge in response to intensity values of pixels that are further displaced from the at least one edge.

27. The method of claim 26 wherein the step of estimating at least one edge comprises a step of generating a gradient image.

28. The method of claim 27 wherein the step of generating a gradient image is preceded by a step of smoothing the image.

29. The method of claim 27 wherein the step of estimating an edge comprises calculating a center of mass for each pixel of the gradient image in response to gradient intensity values and location values of neighboring pixels.

30. The method of claim 29 wherein neighboring pixels of each pixel of the gradient image comprise pixels within a neighborhood pattern.

31. The method of claim 30 wherein the neighborhood pattern is symmetric around the pixel.

32. The method of claim 31 wherein a pixel is located in a vicinity of an edge if a distance between the pixel and at least a portion of edge does not exceed a length of the neighborhood pattern.

33. The method of claim 30 wherein the step of generating an enhanced image is followed by a step of changing the neighborhood pattern and wherein the step of changing the neighborhood pattern is followed by the step of estimating at least one edge of the image.

34. The method of claim 29 wherein the step of calculating a center of mass of a pixel of the gradient image comprising the steps of: generating a sum result by summing results of a multiplication between a intensity value of a neighbor pixel and a location value of the neighbor pixel, for each neighbor pixel; and dividing the sum result by a sum of gradient intensity values of all neighbor pixels.

35. The method of claim 26 wherein the step of generating an enhanced image comprising replacing pixel values of pixels that are located in a vicinity of an edge with pixel values of pixels that are further displaced from the edge.

36. The method of claim 26 wherein the image is generated by a scanning electron microscope.

37. A method for estimating an edge of an image, the method comprising the steps of:

(a) receiving a matrix of pixels representative of an image;

(b) generating a gradient image representative of a difference between values of adjacent pixels;

(c) calculating a center of mass for each pixel of the gradient image in response to gradient intensity values and location values of neighboring pixels; and

(d) estimating a location of a edge in response to the center of mass.

38. The method of claim 26 wherein the image is generated by a scanning electron microscope.

39. A method for generating an enhanced image, the method comprising the steps of :

receiving a matrix of pixels with intensity values, representative of an image;

generating a matrix of values representative of the estimated relevant edges in the image; and

generating an enhanced image represented by a matrix of pixels such that pixel locations in a vicinity of a relevant edge are populated by values that are responsivee to intensity values of pixels that are further displaced from the relevant edge.